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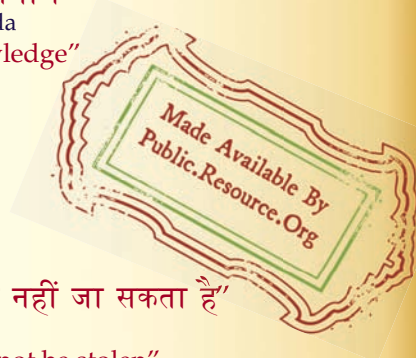
IS 2000-5 (1985): Methods of chemical analysis of bauxite, Part 5: Determination of titania [MTD 13: Ores and Raw Materials]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 2000 (Part 5) - 1985

(Reaffirmed 2001)

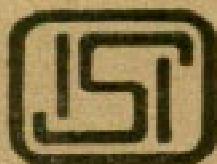
Indian Standard

METHODS OF
CHEMICAL ANALYSIS OF BAUXITE

PART 5 DETERMINATION OF TITANIA

(First Revision)

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INDIAN STANDARDS INSTITUTION

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI 110002

Indian Standard

METHODS OF CHEMICAL ANALYSIS OF BAUXITE

PART 5 DETERMINATION OF TITANIA

(First Revision)

Methods of Chemical Analysis of Ores, Minerals and Refractories
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Indian Standard

METHODS OF CHEMICAL ANALYSIS OF BAUXITE

PART 5 DETERMINATION OF TITANIA

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (Part 5) (First Revision) was adopted by the Indian Standards Institution on 24 December 1985, after the draft finalized by the Methods of Chemical Analysis of Ores, Minerals and Refractories Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 IS : 2000-1962* which covered determination of loss on ignition, total silica, non-reactive and reactive silica; alumina; ferric oxide by dichromate method, permanganate and colorimetric methods; titania by reduction (volumetric) and colorimetric methods; phosphorus; calcium oxide; magnesium oxide and manganous oxide was first published in 1962. While reviewing this standard the Sectional Committee felt the need for the revision of this standard. On the basis of experience gained during these years the committee decided to revise this standard into different parts covering determination of each element in a separate part, which on publication would supersede that element given in IS : 2000-1962*. This part covers determination of titania. The other parts are:

- Part 1 Determination of loss on ignition
- Part 2 Determination of silica (SiO_2 , 0.5 to 10.0 percent)
- Part 3 Determination of alumina
- Part 4 Determination of ferric oxide
- Part 6 Determination of vanadium ($\text{V} < 0.1$ percent)
- part 7 Determination of phosphorus pentoxide ($\text{P}_2\text{O}_5 < 0.5$ percent)
- Part 8 Determination of manganous oxide ($\text{MnO} < 0.5$ percent)

The procedures for determination of CaO and MgO in bauxite are at Present under investigation and will be given in subsequent parts.

*Methods of chemical analysis of bauxite.

IS : 2000 (Part 5) - 1985

0.3 In this revision the reduction (volumetric) method has been deleted and colorimetric method has been substituted by spectrophotometric method.

0.4 In preparation of this revision due consideration has been given to the facilities available in the country to carry out such analysis.

0.5 In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This Standard (Part 5) covers the determination of titania in bauxite in the range of 0.5 to 12.0 percent.

2. SAMPLING

2.1 Sample shall be drawn and prepared as per the method prescribed in 2 of IS : 2000 (Part 1)-1985†.

3. QUALITY OF REAGENTS

3.1 Unless specified otherwise, analytical grade reagents and distilled water shall be employed in the test.

4. DETERMINATION OF TITANIA BY THE SPECTROPHOTOMETRIC METHOD

4.1 Outline of the Method — The yellow colour produced by hydrogen peroxide in sulphuric acid medium in presence of phosphoric acid is measured in a spectrophotometer. Amount of titania is evaluated from the titanium calibration curve obtained under the similar experimental condition.

4.2 Reagents

4.2.1 Dilute Sulphuric Acid — 1 : 1 (v/v).

4.2.2 Dilute Phosphoric Acid — 1 : 3 (v/v).

4.2.3 Hydrogen Peroxide — 20 percent by volume.

4.2.4 Standard Titania Solution (1 ml = 1 mg of TiO_2) — Dissolve 0.5 g of calcined titania in concentrated hydrofluoric acid in a platinum dish. Then add carefully 25 ml of concentrated sulphuric acid and heat to strong fumes to remove fluoride. Cool, dilute with water stirring continuously and make up to 500 ml in a volumetric flask.

*Rules for rounding off numerical values (revised).

†Methods of chemical analysis of bauxite; Part 1 Determination of loss on ignition (first revision).

4.3 Procedure

4.3.1 Take a suitable aliquot (containing more than 0.5 mg TiO_2) from the main solution [*see* 5.3.3 of IS : 2000 (Part 2)-1985*] in a 100 ml volumetric flask add 10 ml of sulphuric acid, 1-2 ml of phosphoric acid and dilute to about 80 ml volume. Add about 3 ml of hydrogen peroxide, shake to mix the solution. Make up to the mark with water. Measure the intensity of the colour after half-an-hour in a spectrophotometer at 425 nm in a suitable cell.

4.3.2 A standard curve is prepared from 0, 0.5, 1, 2, 3 and 4 ml of standard titania solution in a 100-ml volumetric flask following the procedure as described in 4.3.1.

4.4 Calculation

$$\text{TiO}_2, \text{ percent} = \frac{A}{B} \times 100$$

where

A = mg of TiO_2 present in the sample, and

B = mass in mg of the sample taken.

*Methods of chemical analysis of bauxite: Part 2 Determination of silica (*first revision*).

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²



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